USB Type-C ENGINEERING CHANGE NOTICE

Title: USB Type-C ECR E-marked Cables shall only use VCONN

Applied to: USB Type-C Specification Release 2.0, August 2019

Brief description of the functional changes proposed:

All active cables except optically isolated active cables shall only be powered from Vconn unless VCONN is not present in which case they can be powered by VBUS. Added a timing requirement to Table 4-6 for the switch from VBUS to VCONN power.

Benefits as a result of the proposed changes:

VCONN was created specifically as the means to power the cable. When short active cables are powered from VBUS the following issues occur:
1. USB PD Power Role Swap breaks the USB3 link.
2. Active cable compliance fixture becomes more complicated.
3. The VBUS power reported to the Sink is not correct as the cable is consuming power unless the cable modifies the Source capabilities which is complicated.
4. Cables are required to be tolerant to at least 21V.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:

There are no known active cables released which pull power from VBUS.

An analysis of the hardware implications:

Some active cable designs that require Vbus will have to be redesigned to only consume VCONN.

An analysis of the software implications:

No impact to existing designs.

An analysis of the compliance testing implications:

Compliance is in development and can be modified to support this change.

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Actual Change Requested

(a). Section 2.5, Page 36

From Text:

Electronically marked cables may use VBUS instead of VCONN as VBUS is available across the cable. VCONN functionally differs from VBUS in that it is isolated from the other end of the cable. VCONN is independent of VBUS and, unlike VBUS which can use *USB PD* to support higher voltages, VCONN voltage stays within the range of 3.0 to 5.5 V (vVCONNValid).

To Text:

Once VCONN is available, all electronically marked cables shall use it as the only power source. If VCONN is applied after VBUS, then until VCONN is available, the cable may remain unpowered or may draw power from VBUS. ~~All electronically marked cables shall only be powered from may initially be powered by VBUS if VCONN is not present. the cable shall only draw from VCONN.~~ Cables that include an eMarker shall meet the maximum power defined in Table 4-6.

The only exception is an Optically Isolated Active Cable (OIAC Section 6), which ~~can~~ are allowed to draw from both VCONN and VBUS.

VCONN functionally differs from VBUS in that it is isolated from the other end of the cable. VCONN is independent of VBUS and, unlike VBUS which can use *USB PD* to support higher voltages, VCONN voltage stays within the range of 3.0 to 5.5 V (vVCONNValid).

(b). Section 4.9, Page 231

From Text:

Table 4-6

To Text: (addition)

	Minimum	Maximum	Notes
tVconnSwitch		tVCONNStable~~10ms~~	Cables which optionally use VBUS shall power from VCONN within ~~10ms after VCONN reaches vt~~VCONN~~Valid~~Stable.

(c). Section 4.9, Page 231

From Text:

Electronically marked cables are generally powered from VCONN, although VBUS or another source may be used. Cables that include an eMarker shall meet the maximum power defined in Table 4-6.

To Text:

Once VCONN is available, all electronically marked cables shall use it as the only power source. If VCONN is applied after VBUS then until VCONN is available, the cable may remain unpowered or may draw power from VBUS. Within tVCONNSwitch, the cable shall switch from VBUS to VCONN. Cables that include an eMarker shall meet the maximum power defined in Table 4-6. The only exception is an Optically Isolated Active Cable (OIAC Section 6), which ~~are~~is allowed to draw from both VCONN and VBUS.

(d). Section 6.4.4, Page 298

From Text:

Active Cables shall:

- Meet the VCONN sink requirement defined in Table 4-6 and Table 6-19.
- Connect VCONN as shown in Figure 2-1 or Figure 2-2.

Short Active Cables shall be capable of being powered from VCONN from only one port.
OIAC shall be powered from VCONN from each port.

To Text:

Active Cables shall:

- Meet the VCONN sink requirement defined in Table 4-6 and Table 6-19.
- Connect VCONN as shown in Figure 2-1 or Figure 2-2.

~~Short Active Cables shall be capable of being powered from VCONN from only one port.~~
~~OIAC shall be powered from VCONN from each port.~~
Active Cables shall meet the VCONN requirements specified in Section 4.9.~~A~~